## 2K1 Mars - FROG-2

**DATA FOR 2025 (standard update)**
**Complex 2K1 "Mars", rocket 3R1 "Owl" - FROG-2**
★★★★

Tactical missile system / heavy rocket system. The system and the rocket were developed by NII-1 (since 1967 - Moscow Institute of Heat Engineering), chief designer N.P. Mazurov. R & D on the long-range powder rocket was conducted in 1948-1951. The technical assignment for the design of "tactical missiles with a firing range of up to 50 km" was issued in 1953. By Resolution of the USSR Council of Ministers No. 1745-793 of August 26, 1954, NII-1 was instructed to develop a rocket, based on the propulsion system of a long-range rocket, capable of delivering an RDS-4 type atomic charge to a range of up to 20 km. In this case, the accuracy characteristics had to be within 1/100 of the range deviation and 1/90 of the lateral deviation (as a fraction of the operating range). The

already tested gunpowder engine allowed NII-1 (subordinate to the 6th Main Directorate of the Ministry of Defense since 1954) to begin R&D on the creation of a missile with a 600 mm diameter super-caliber warhead for a nuclear charge. This allowed the foundation to be laid for work on the 3R1 projectile for the Mars complex . From August 21 to October 10, 1954, the first tests of 10 unguided missiles in inert warheads were conducted at the Kapustin Yar test site , which demonstrated the possibility of achieving the required characteristics.

Preliminary calculations for the use of the RDS-4M charge in the ZR1 missile showed that the nuclear charge was too heavy. As a result of work on the ZR1 Mars missile, work was suspended and the RDS-4M nuclear charge designed by Yu. B. Khariton, N. L. Dukhov, and E. A. Negin was adapted for the heavy 650 mm PR-850 powder rocket. To equip the 3R1 Mars missile, it was proposed to use a smaller-sized RDS-9 implosion-type nuclear charge developed in KB-11 for the 533 mm T-5 torpedo under the supervision of Yu . B. Khariton, N. L. Dukhov, E. A. Negin, and E. I. Zababakhin.

According to the Resolution of the Council of Ministers of the USSR No. 3-2 of January 2, 1956, work began on the creation of the 2P1 Mars heavy rocket system. The resolution set tactical and technical requirements No. 007100 for the missile system. SKB-3 TsNII-58 (chief designer V.G.Grabin) began designing the launchers for the system. The design for the launchers was accepted by the GAU commission on April 5, 1956 under requirements No. 007100. In June 1956, the developed technical design for the system was reviewed and accepted by the GAU artillery committee.

Launcher 2P2 of the Mars complex with a 3R1 missile with a nuclear warhead in the artillery museum in St. Petersburg

Author: DIMMI Created: 04.04.2009 09:29:44 Comments: 8 READ THE FULL ARTICLE

## R-36-O / 8K69 - SS-9 mod.3 SCARP FOBS

**DATA AS OF 2024 (standard replenishment)**
**8P769 complex, R-36-O / 8K69 missile - SS-9 mod.3 SCARP FOBS**
★★★★

Global intercontinental ballistic missile (ICBM). The missile was developed by OKB-586 (since 1966 - Yuzhnoye Design Bureau, Dnepropetrovsk, General Designer - M.K. Yangel), Chief Designer - M.I. Galas. The development of an orbital missile was assigned by Resolution of the USSR Council of Ministers No. 346-160ssov “On the most important developments of intercontinental ballistic and global missiles and carriers of heavy space objects” dated April 16, 1962. The resolution gave the start to the development of three versions of the missile: intercontinental, orbital and space. Tests of the orbital version of the missile were planned to begin in the 3rd quarter. 1964 ( *history - Gorbulin* ). The decisions of the April Resolution were specified in the Resolution of the USSR Council of Ministers No. 1021-436ss of 12.05.1962, which assigned the development of orbital rockets to three design bureaus at once - 8K69 OKB-586, GR-1 / 8K713 OKB-1 and 8K83 / UR-200 OKB-52.

The global ICBM in the West was named FOBS - Fractional Orbital Bombardment System - "partial orbital bombardment (strike) system". The main

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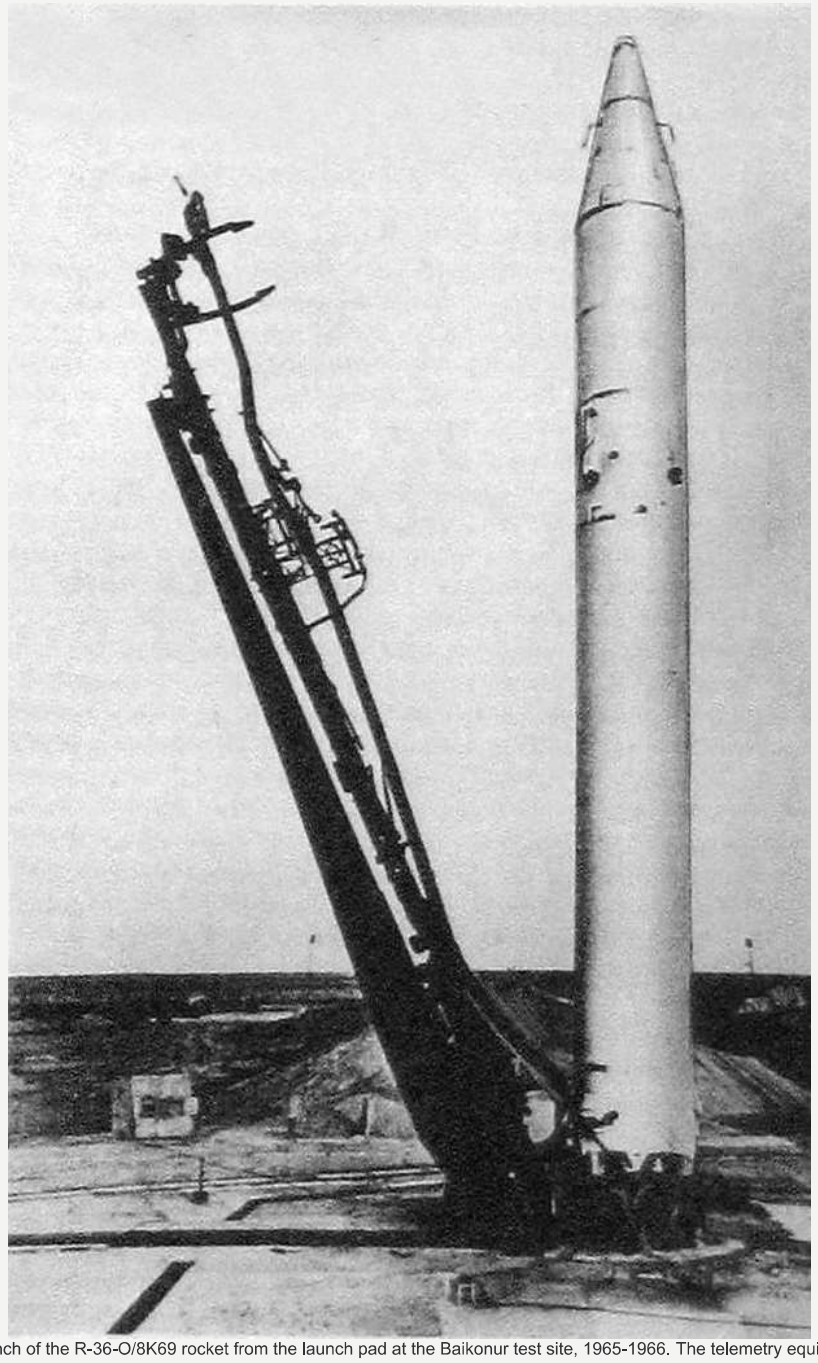
advantages of this type of missile over a conventional ICBM:
- unlimited range;
- the ability to hit a target with different missiles, but simultaneously from different directions (for example, through the North and South Poles);
- shorter flight time to the target in the shortest direction than a conventional ICBM;
- the impossibility of predicting the area of the warhead's fall while it is in the orbital portion of the flight;
- satisfactory accuracy at maximum ranges.

The rocket and orbital stage were developed by OKB-586, the propulsion system for the orbital unit was created by OKB-456 of Chief Designer V.P. Glushko, the control system by NII-692 ("Khartron") of Chief Designer V.G. Sergeev, the command devices by NII-944 of Chief Designer V.I. Kuznetsov, the combat launch complex by TsKB-34 of Chief Designer E.G. Rudyak. The preliminary design of the R-36-O was developed in December 1962.

In early 1965, a decision was made to develop only the 9K69 missile by OKB-586 as an orbital rocket. S.P. Korolev's design bureau stopped developing the GR-1 / 8K713. The UR-200 (8K81) and UR-200A (8K83) missiles of V.N. Chelomey's design bureau were taken out of production.

Initially, the ampulization of the missile was not envisaged, but on January 12, 1965, the State Committee for Defense Industry issued an order "On the deployment of work on the ampulization of the R-36 and R-36-O missiles", which set the work on modifying the ICBM for long-term presence in a fueled ampulized state on combat duty - the initial guaranteed shelf life of a fueled missile was 5 years. Later, this period was increased to 7.5 years.



Preparation for the launch of the R-36-O/8K69 rocket from the launch pad at the Baikonur test site, 1965-1966. The telemetry equipment antennas on the warhead were later removed ( Strategic ground-based missile systems. Moscow, "Military Parade", 2007 )

Author: DIMMI Created: 20.03.2022 10:38:23 Comments: 1 READ THE FULL ARTICLE

## MR UR-100 / 15A15 / MR UR-100UTTH / 15A16 - SS-17 SPANKER

**DATA AS OF 2024 (standard replenishment)**
**Complex 15P015, missile MR UR-100 / 15A15 / RS-16A - SS-17 mod.1/2 SPANKER**
**Complex 15P016, missile MR UR-100UTTKh / 15A16 / RS-16B - SS-17 mod.3 SPANKER Third-generation**
★★★

intercontinental ballistic missile (ICBM). The missile was developed by the Yuzhnoye Design Bureau (Dnepropetrovsk). The development was launched by the decision of the USSR Defense Council dated August 27, 1969, which tasked the design bureau with creating a complex with a heavy 15A14 / R-36M ICBM installed in hardened OS-67 silos, a complex with a light 15A15 / MR UR-100 ICBM installed in hardened OS-84 silos, and a combat railway missile complex with an ICBM. The decision to begin work was made during a visit to the Yuzhnoye Design Bureau by the Chairman of the Military-Industrial

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Sierra 2011-05-3

Complex under the USSR Council of Ministers L.V. Smirnov in April 1970. Resolution of the USSR Council of Ministers No. 682-218 dated August 19, 1970 launched the full-scale development of a light ICBM. The development was offered on a competitive basis to two design bureaus - the Yuzhnoye Design Bureau and the Machine-Building Design Bureau. The task was set to develop projects for the modernization of the mass missile complex with the UR-100 ICBM developed by the Machine-Building Design Bureau (OKB-52). According to this Resolution, the new missile was to be tested in 1973.

The draft design of the MR UR-100 ICBM (apparently stands for "Modernization of the UR-100 Rocket") was released in September 1970. It was assumed that the UR-100 ICBM silos would be used, and, accordingly, this limitation affected the design of the missile. Simultaneously with the development of the 15A15 missile complex, the Yuzhnoye Design Bureau was working on a modernized version of the 15A14 (R-36M) heavy ICBM, which was somewhat ahead of the new light ICBM in time. This made it possible to use some of the developments from the 15A14 project in the 15A15 missile - both missiles had a mortar launch, the use of a multiple warhead, a single unified warhead, similar solid-propellant rocket motor designs for the warhead deployment stage, and a new control system using a digital computer.

The development was carried out by the following cooperation of enterprises:
- the complex as a whole and the missile - Yuzhnoye Design Bureau (lead designer - M.I. Galas, later - S.I. Us)
- production of missiles for experimental development and subsequent series - NPO Yuzhmash
- silo launcher - KB-4 KBSM (chief designer - B.G. Bochkov, since 1970 - A.F. Utkin)
- missile complex command post - TsKBTM MOM (chief designer - E.G. Rudyak, since 1970 - V.S. Stepanov)
- automated combat control and communications system - OKB of the Leningrad Polytechnic Institute (chief designer - T.N. Ssokolov)
- internal power supply system - GOKB of the Moscow Plant "Prozhektor" (chief designer - V.A. Okunev)
- missile transportation units - TsKBTM MTM (chief designer - L.D. Novikov)
- aiming devices - Central Design Bureau "Arsenal" (chief designer - S.P.Parnyakov)
- cruise engines of both stages - OKB-456
- missile control system and ground-based test and launch equipment - NII-692 ("Khartron")
- radio correction system - NII-885
- command gyro devices - NII-944 under the direction of V.I. Kuznetsov (now NIIPM named after Academician V.I. Kuznetsov)
- special charges and automatic warheads - KB-11 (VNIIEF)
- missile defense penetration system - OKB-586
- missile system refueling system - KBTHM
- combat control system - NIIAP

ICBM 15A15 / MR UR-100 - SS-17 mod.1 SPANKER in a transport and launch container. Monument in Dnepropetrovsk (https://rvsn.ruzhany.info/).

Author: DIMMI Created: 24.03.2022 21:07:51 Comments: 30 READ THE FULL ARTICLE

## 9K72 / R-17 - SS-1C/D/E SCUD-B/C/D

**DATA FOR 2024 (standard update)**
**Complex 9K72 "Elbrus", missile R-17 / 8K14, SPU 2P19 - SS-1B SCUD-A**
**9K72 Elbrus complex, R-17/8K14 missile - SS-1C SCUD-B**
**9K72 Elbrus complex, R-17/8K14-1 missile - SS-1C SCUD-B**
**9K73 complex, R-17V missile / 8K114 ("helicopter")**
**9K72-O complex, R-17VTO / 8K14-1F Aerofon missile (with optical seeker) - SS-1E SCUD-D**
**R-300 is the export designation for the 9K72 missile system.**
★★★★★

Operational-tactical missile system. The development was carried out in SKB-385 under the supervision of Chief Designer V.P. Makeev (Deputy Chief Designer - V.R. Serov, Lead Designer - Yu. Bobryshev) as part of the modernization of the R-11M missile under the R-11MU research project since 1957. As a result of the research, in December 1957, the SKB came up with a proposal to create an operational-tactical missile system with a range double that of the R-11M by replacing the engine with an engine with a turbopump unit and modifying the missile.

On February 24, 1958, documents were signed by the Military-Industrial Complex under the USSR Council of Ministers and Resolution of the USSR Council of Ministers No. 378-181 of April 1, 1958, which launched the creation of a system with an operational-tactical missile with an inseparable warhead based on the R-11M missile. The draft design was defended at NII-88 in September 1958, and the design documentation was completed in November 1958. Production of the pilot series and prototypes (R-17 - version 1 - OKB-3 engine) was carried out at the SKB-385 plant in Zlatoust in 1958-1959. In April 1959, the tactical and technical requirements of the GAU of the Ministry of Defense of the USSR for the missile were received. In May 1959, the TTT were approved, and the missile index was received GAU 8K14.

According to the Decree of the USSR Council of Ministers of June 17, 1959, serial production of R-17/8K14 missiles (R-17 - version 2 - OKB-5 engine - since 1962) was carried out at the Votkinsk Machine-Building Plant No. 235 (Votkinsk, series from 1959 to 1985). At the end of July 1959, assembly of the first two missiles for firing tests began. Assembly of missiles for flight tests began in August 1959.

*Special thanks to "Pensioner" (http://russianarms.ru) for assistance in preparing materials.*

8K14 missile of the 9K72 complex with the 9P117 SPU (photo by V.P. Makeyev Design Bureau)

Author: DIMMI Created: 23.03.2009 22:44:16 Comments: 114 READ THE FULL ARTICLE

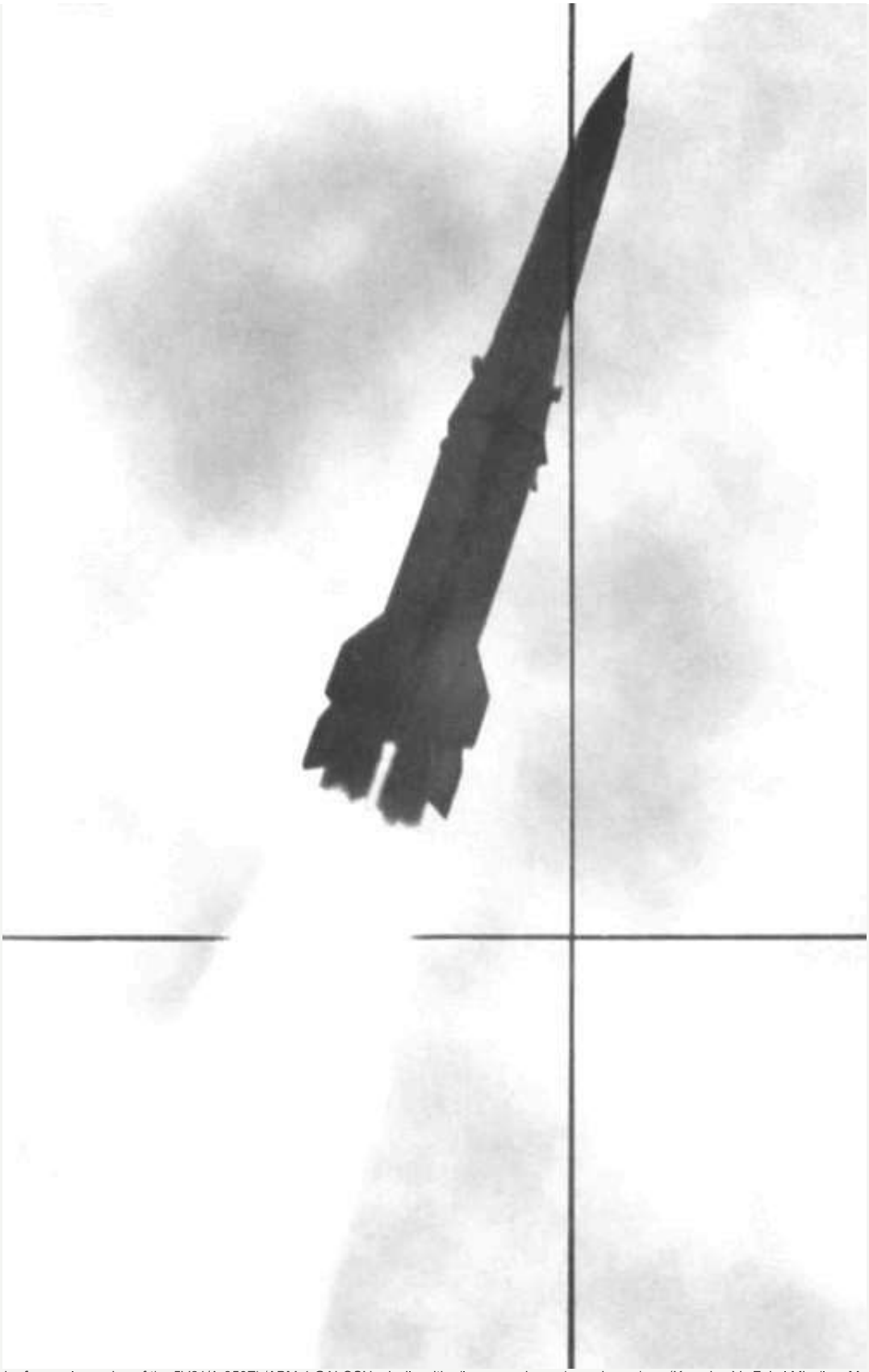
## A-35 Aldan system, A-350Zh / 5V61 missile - ABM-1 GALOSH

**DATA AS OF 2023 (standard replenishment)**
**A-35 system, Aldan complex, V-1100 / A-350Zh / 5V61 / UR-96 missile - ABM-1 GALOSH / SH-01**
**A-35 system, V-1100 / A-350Zh / 5V61 / UR-96 missile - ABM-1 mod.1 / ABM-1A GALOSH**
★★★★

ABM system of the Central Administrative-Industrial Region of the USSR / Moscow. Lead developer - OKB-30 (until 1962 - SKB-30 KB-1), chief designer of the system - G.V. Kisunko . The missile was created in OKB-2 under the supervision of P.D. Grushin (now - MKB Fakel, Khimki). The Resolution of the USSR Council of Ministers "Anti-Missile Defense Issues" dated April 8, 1958, outlined the development of the A-35 ABM combat system. The ABM system was based on the following principles: the ABM system protects the administrative-industrial region, and targets are intercepted outside the atmosphere by anti-missiles with nuclear warheads. The contractors and work schedule were determined by the Resolutions of the USSR Council of Ministers "On the A-35 System" dated December 10, 1959 and "On the Creation of the ABM System of the Moscow Industrial Region" dated January 7, 1960.

- SKB-30 KB-1 / OKB-30 (G.V. Kisunko) - the ABM system as a whole, missile guidance systems, autopilot, etc.;
- OKB-2 MAP (P.D. Grushin) - the A-350 anti-missile, launch and technical positions of the ABM system;
- NII-1011 MSM - nuclear warhead of the A-350 anti-missile.

According to the pre-draft design of 1962, the ABM system included 8 Danube-3 AWACS radars with a total field of view of 360 degrees, a command and control center and 32 firing complexes (8 launchers each - a total of 256 launchers, with missiles with conventional and nuclear warheads). The draft design of the A-35 Moscow system was finalized in June 1961, taking into account the tests of the ABM system " A ", conducted in the first half of 1961, and defended in the fall of 1962. In June 1962, the draft design of the warhead of the A-350Zh anti-missile was defended at NII-1011. According to the design, the Moscow ABM system was to include 8 firing complexes, ensuring the interception of 6 paired targets attacking Moscow from the same or different directions. In order to test the system components, it was planned to build and test the Aldan missile defense testing ground complex simultaneously with the deployment.



Launch of an early version of the 5V61/A-350Zh/ABM-1 GALOSH missile with ailerons and gas-dynamic engines (Korovina V., Fakel Missiles. Moscow, Fakel Design Bureau, 2003).

Author: DIMMI Created: 28.03.2010 15:48:57 Comments: 282 READ THE FULL ARTICLE

## RSD-10 Pioneer - SS-20 SABER

**DATA FOR 2023 (standard update)**
**Complex 15P645 "Pioneer", missile 15Zh45 / RSD-10 / RT-21M - SS-20 SABER mod.1**
**Complex 15P645K "Pioneer-K" / "Pioneer-M", missile 15Zh45 / 15Zh46 (?) / RSD-10 / RT-21M - SS-20 SABER mod.1**
**Complex 15P653 "Pioneer-UTTH" / "Pioneer-2", missile 15Zh53, 15Zh54 / RSD-10UTTH - SS-20 SABER mod.2**
**Complex 15P656 "Gorn", missile 15Zh56**
★★★★

Mobile ground missile system (PGRK) with a medium-range ballistic missile (MRBM). The system was developed by the Moscow Institute of Thermal Engineering (MIT), chief designer - A.D. Nadiradze, using the experience of creating and on the basis of the PGRK "Temp-2S" / SS-X-16 . The 15Zh45 missile was created on the basis of the 1st and 2nd stages of the mobile ICBM "Temp-2S" . The R&D project for the creation of the PGRK was called

"15K645 "Pioneer". Work on the complex began in 1971.

The complex is designed to destroy strategically important stationary objects at a range of 600 to 5000 km.

Development of the complex began in accordance with the Resolution of the Council of Ministers of the USSR No. 280-95 issued on April 28, 1973 on the development of the Pioneer complex by a cooperation of enterprises working on the creation of the Temp-2S ICBM complex . The resolution provided for the creation of an IRBM with a MIRV based on the 1st and 2nd stages of the Temp-2S ICBM. The start date for joint flight tests was set at the second quarter of 1974.

Cooperation of developers:
- MIT - lead developer of the complex, missile development
- TsKB "Titan" (Volgograd) - SPU and support vehicles for the complex
- Design Bureau of the Minsk Automobile Plant (Minsk) - SPU chassis
- NPO Soyuz (Lyubertsy) - solid propellant sustainer charges made of mixed fuel
- NPO Avtomatiki i Priborostroeniya (Moscow) - complex control system
- KB-1 VNIIEF - lead developer of 15Zh45 missile combat equipment

In December 1973, a draft design of the complex was released, which was successfully defended in the 1st quarter of 1974. Ground testing of the missile design elements began. The complex equipment, ground equipment units, combat unit structure, combat control scheme and means, combat duty procedure and daily operation were borrowed from the Temp-2S ICBM complex.

The thermonuclear charge for the warhead was developed by VNIITF up to the stage of pilot production for the UR-100K ICBM and its development for serial production for equipping the warhead of the 15Zh45 MRBM was completed in 1976 ( source ).

SPU 15U106 of the 15P645 "Pioneer" complex - SS-20 SABER in pre-launch position (processed photo from the collection "Weapons of Russia", MilitaryRussia.Ru, 2011).

Author: DIMMI Created: 31.07.2010 00:03:08 Comments: 436 READ THE FULL ARTICLE

## 2K6 Luna - FROG-3/4/5/6

**DATA FOR 2024 (standard update)**
**Complex 2K6 "Luna", missile 3R5**
**Complex 2K6 "Luna", missile 3R9 - FROG-3**
**Complex 2K6 "Luna", missile 3R10 - FROG-5**
**Geophysical option - FROG-4**
**Installation Br-226-I (YAZ-214), missile 3P11 - FROG-6**
**R-30 is the export name of the complex.**
★★★★

Tactical missile system. Preliminary development of the project began in 1953 at NII-1 (later renamed the Moscow Institute of Heat Engineering), chief designer N.P. Mazurov. Design work on the system began in full in accordance with Resolution of the USSR Council of Ministers No. 1302-660 of September 13, 1956 - a missile with a range of 40-45 km was created at NII-1 and a self-propelled launcher for it was created at TsNII-58 under the supervision of V.G. Grabin. Resolution of the USSR Council of Ministers No. 558-583 of May 16, 1957 on the creation of prototypes and testing was issued after the defense of the draft and technical designs of the system. The prototype of the 3R5 missile was manufactured by Plant No. 75 of the Kemerovo Economic Council.

Experimental SPU and TZM were assembled by TsNII-58 in 1958. The complex testing began in 1958 (Kapustin Yar test site). After N.S. Khrushchev visited the test site in the fall of 1958, the TZM production was banned ("not effective"). From January 30 to February 28, 1959, the Mars and Luna systems were tested in low-temperature conditions at the Aginsky test site (Transbaikal Military District, 6 3R5 missile launches were conducted).

SPU 2P16 of the 2K6 "Luna" complex with a 3R9 missile. In the background is a 3R10 missile. Parade on Red Square in Moscow, 1960s.

Author: DIMMI Created: 05.04.2009 18:20:37 Comments: 180 READ THE FULL ARTICLE

## Tar

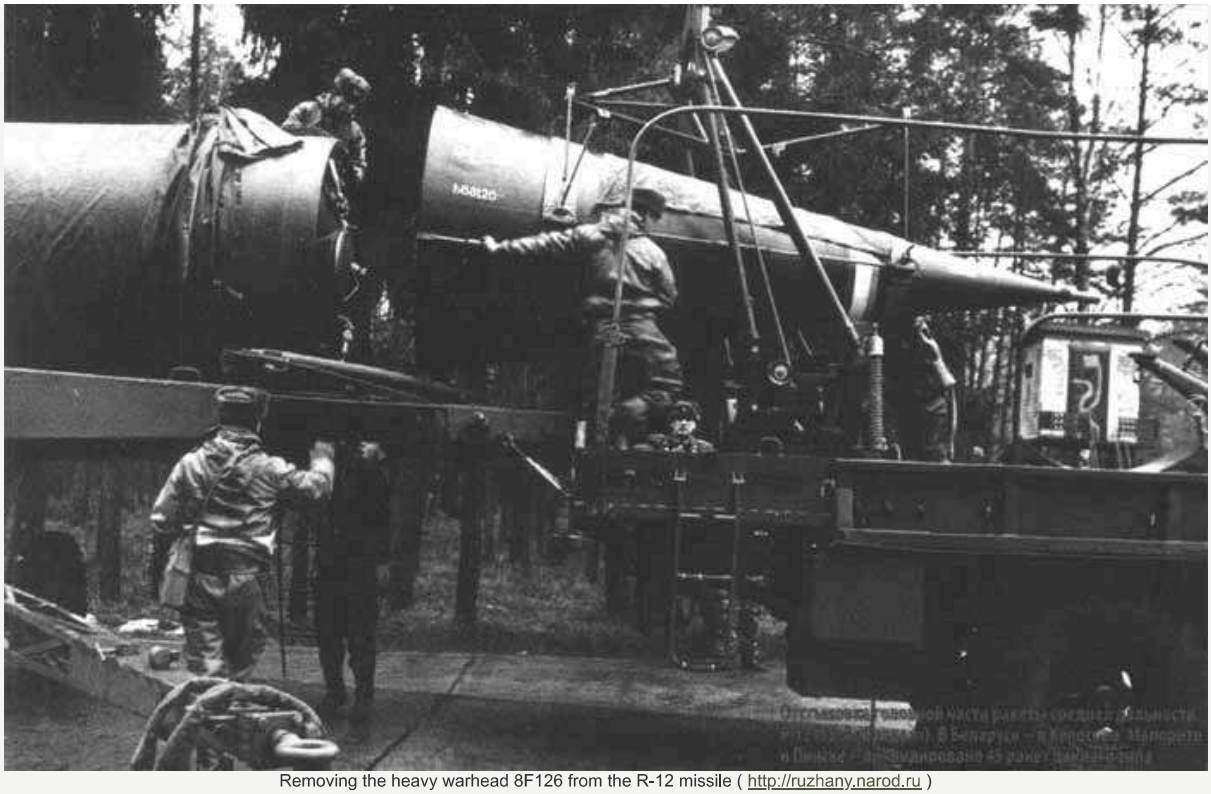
**DATA AS OF 2024 (standard replenishment)**
**"Gudron" system**
★★★

Nuclear charge amplification system. A set of means and technical solutions for increasing (enhancing) the power of nuclear charges developed in the late 1950s. Used in nuclear charges of the Strategic Missile Forces missile systems in the 1960-1970s.

In December 1957, in KB-11, under the leadership of S. B. Kormer, a unique result of increasing the power of a nuclear charge was obtained, which was called "Gudron". On December 28, 1957, at the Semipalatinsk test site, the RDS-9 charge with gas boosting was tested - in some sources called "product 19" (RDS-19) - the plutonium charge was boosted by a gas mixture of DT (deuterium + tritium). S. B. Kormer was engaged in gas boosting the efficiency of a nuclear charge . One of the reports said that the problem had no solution because the cavity of the product was filled with explosion products prematurely (1954). As a result, in December 1957, the product was prepared for testing and successfully tested. S. B. Kormer became a laureate of the Lenin Prize of the USSR in 1959.

By the end of the unilateral moratorium on nuclear tests (September 1958), nuclear charges were prepared that combined an increase in power with a simultaneous increase in combat readiness and safety of charge maintenance, and a decrease in cost. The developers took the path of using a more powerful explosive substance, and also applied an original scheme for increasing the power during the explosion of an atomic detonator (the "Gudron" system, source ). The first test of a charge developed by KB-11 of a new type (probably with a charge amplifier) was successfully carried out at the Novaya Zemlya test site on 15.10.1958 (test No. 72, power 1500 kt, source ). According to the recollections of nuclear testers, the units of the new charge, manufactured individually, turned out to be far from hermetic in operation, so they were delivered to the test sites by planes packed in two special shells: a container and a supercontainer, which were under excess pressure. The tests were supervised by Deputy Chief Designer (later Chief Designer and Director of the Institute, Academician) Yevgeny Arkadyevich Negin as the technical director on behalf of KB-11. The Chairman of the State Commission and the head of the tests was the Head of the Main Directorate of Experimental Designs (GUOK) of the Ministry of Medium Machine Building, Lieutenant General Nikolay Ivanovich Pavlov. Work with the "reactors" (amplifiers) was carried out in gas masks and was associated with the risk of radiation and contamination.

There is a hypothesis that in different years the "Gudron" amplifier used different principles of amplifying the power of a nuclear charge. At the first stage, this was amplification due to an additional charge of uranium-235 or plutonium (see above). Later, it was possibly gas amplification of the reaction using gaseous tritium or similar technology.



Removing the heavy warhead 8F126 from the R-12 missile ( http://ruzhany.narod.ru )

Author: DIMMI Created: 11.04.2023 15:42:03 Comments: 1 READ THE FULL ARTICLE

## Hazel

**DATA FOR 2024 (replenishment required)**
**"Oreshnik" - SS-X-31B / SS-X-34**

Medium-range ballistic missile. Developed by the Moscow Institute of Thermal Engineering (MIT). In July 2023, the country's leadership decided to develop a missile in a non-nuclear version based on the Rubezh ICBM. Probably, theoretical development of the creation of such a complex under the code name "Kedr" was carried out since 2022 or earlier. The missile is being created using the developments of other missile systems developed by MIT - "Yars", "Bulava", etc.

According to Western data, cooperation in the development of the missile system includes:
- Moscow Institute of Thermal Engineering - lead developer of the complex and the rocket;
- FNPC "Titan-Barricades" (Volgograd) - autonomous launcher and auxiliary vehicles of the complex;
- TsNIIAG (Moscow) - development of rocket control system devices
- FTsDT Soyuz - development of propulsion system
- OKB Prozhektor (Moscow)
- Concern "Sozvezdie" (Voronezh);
- NPP “Spetsenergomekhanika” (Moscow);
- Research Center of Special Equipment and Conversion “Continent” (Moscow).

According to Western data, missile tests began with a launch at the Kapustin Yar test site in October 2023 and continued with a launch in June 2024. The third test launch was a test-combat launch - on November 21, 2024, the missile (or missiles) were used against a combat target - the Yuzhmash production association in Dnepropetrovsk. The combat equipment of a new type is a MIRV with a cluster filling (6 x 6 warheads) or a set of missile defense missile systems.

Following the launch on November 21, 2024, the Commander-in-Chief of the Strategic Missile Forces S. Karakayev proposed accepting the Oreshnik PGRK into service.


Western sources consider the Oreshnik MRBM to be a modification of the RS-26 Rubezh ICBM (reconstruction of the RS-26 Rubezh from MilitaryRussia.Ru , version from 21.01.2018)

Author: DIMMI Created: 23.11.2024 07:21:01 Comments: 6 READ THE FULL ARTICLE

## Missile indices of the RViA SV

**DATA AS OF 2024 (standard update)**
**Indices of missile systems of the Missile Forces and Artillery of the Ground Forces of the Russian Federation**
★★★

Indices of missile systems as of 2020:

| Complex | Rocket | Western designation | SPU / APU | Rocket developer | Note |
|---|---|---|---|---|---|
| 9K71 "Temp" | 9M71 | SS-12 SCALEBOARD / KY-06 | 9P11 | MIT | |
| 9K72 "Elbrus" | 8K14 | SS-1C SCUD-B | 9P117 | SKB-385 | |
| 9K73 | 8K114 | | 9P115 | SKB-385 | helicopter |
| 9K74 | cruise missile 4K-95 | SSC-1A SHADDOCK | 9P116 | OKB-52 | helicopter |
| 9K76 "Temp-S" | 9M76 | SS-12 / SS-22 SCALEBOARD | 9P120 | MIT | |
| 9K77 "Record" | 9M77 | SS-1D SCUD-C/KY-03 | | SKB-385 | |
| | cruise missile 9M78 | SSC-1A SHADDOCK | | OKB-52 | |
| 9K79 "Point" | 9M79 | SS-21A SCARAB-A / FROG-9 | 9P129 | KBM | |
| 9K711 "Uran" | 9M711 (?) | | | MIT | |
| 9K712 "Elbrus" | 9M712 (?) | | | MIT | |
| 9K713 (?) "Agate" | 9M713 (?) | STERLITE | | MIT | |
| 9K714 "Oka" | 9M714 | SS-23 SPIDER-A | 9P71 | KBM | |
| 9K715 "Iskander" | 9M715 (?) / 9M723 | SS-X-26 STONE | | KBM | |
| 9K716 "Volga" | 9M716 (?) | | | KBM | |
| 9K717 / 9K714U "Oka-U" | 9M714U / 9M717 / 9M720 | SS-23 SPIDER-B / KY-19 | 9P74 | KBM | |
| 9K718 / 9K79-1 "Tochka-U" | 9M79-1 / 9M721 | | | KBM | |
| 9K719 (?) "Wave" | 9M719 (?) | | | KBM | |
| 9K720 "Iskander-M" | 9M723-1 | SS-26 STONE-A | | KBM | |
| 9K720 "Iskander-M" | 9M728 / R-500 | SS-26 STONE-C | | Innovator | |
| 9K722 "Iskander-MKR" (?) | 9M729 | | 9P701 | Innovator? | |
| | 9M730 | | | Innovator | |

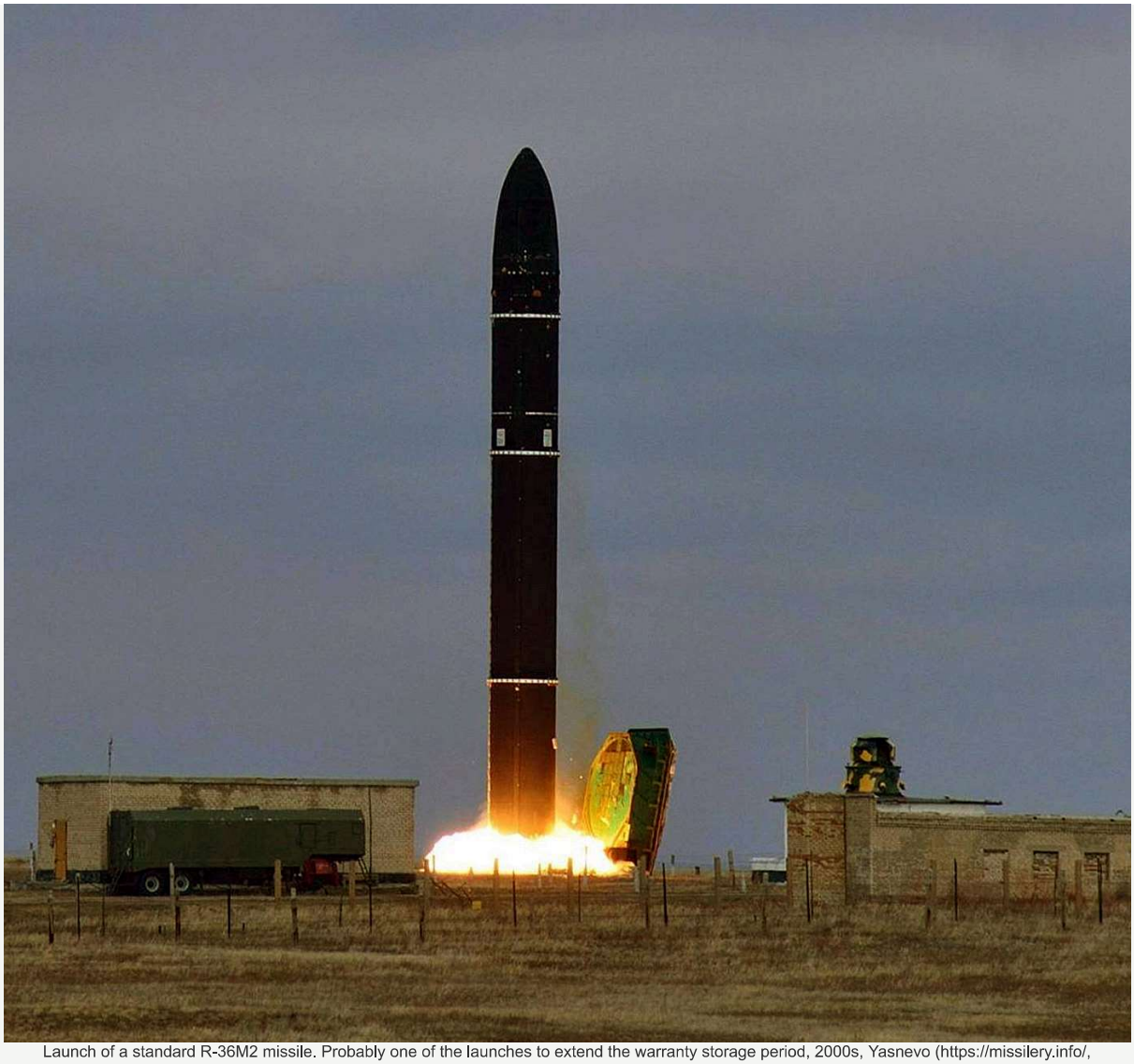
Author: DIMMI Created: 14.12.2020 00:26:47 Comments: 1 READ THE FULL ARTICLE

## R-36M2 / RS-20V Voevoda - SS-18 mod.5-6 SATAN

**DATA FOR 2024 (standard update)**
**Complex 15P018M "Voevoda", missile R-36M2 / 15A18M / RS-20V / mono MS 15F175 - SS-18 mod.5 SATAN / TT-09**
**Complex 15P018M "Voevoda", missile R-36M2 / 15A18M / RS-20V / MIRV IN 15F173 - SS-18 mod.6 SATAN**
★★★★
Author of the original article: Maksim Pashnev (Obninsk), 2012.

Fourth-generation intercontinental ballistic missile. The system and the missile were developed at the Yuzhnoye Design Bureau (Dnepropetrovsk, Ukraine) under the supervision of Academician of the USSR Academy of Sciences V.F. Utkin in accordance with the tactical and technical requirements of the USSR Ministry of Defense and Resolution of the CPSU Central Committee and the USSR Council of Ministers No. 769-248 of August 9, 1983. Chief designers were S.I. Us and V.L. Katayev. After V.L. Katayev was transferred to the apparatus of the CPSU Central Committee, he was replaced by V.V. Koshik. The Voevoda complex was created as a result of the implementation of a multilateral improvement project for the R-36M UTTKh/15P018 heavy-class strategic complex with the 15A18 heavy-class ICBM and is designed to engage all types of targets protected by modern missile defense systems in any combat conditions, including multiple nuclear impacts on a position area (guaranteed retaliatory strike, *source - Strategic missiles* ).

In June 1979, the Yuzhnoye Design Bureau developed a technical proposal for the Voevoda missile complex with a fourth-generation heavy liquid-propellant ICBM under the index 15A17. The preliminary design of the missile complex with the R-36M2 Voevoda ICBM (the ICBM index was changed to 15A18M in order to ensure compliance with the requirements of the SALT-2 Treaty) was developed in June 1982. At the same time, in June 1982, the preliminary design of the ICBM complex control system was released.



Launch of a standard R-36M2 missile. Probably one of the launches to extend the warranty storage period, 2000s, Yasnevo (https://missilery.info/, processed).

Author: DIMMI Created: 02.10.2011 21:17:16 Comments: 163 READ THE FULL ARTICLE

## GR-1 / 8K713 - SS-X-10 SCRAG (wrong)

**DATA AS OF 2024 (standard replenishment)**
**GR-1 / 8K713 - SS-X-10 SCRAG (erroneous)**
★★★

Intercontinental ballistic missile (ICBM) / global missile. The missile was developed by Special Department No. 3 (headed by Sergei Sergeevich Kryukov) of OKB-1 of General Designer S.P. Korolev since 1961. Letter from OKB-1 dated 09/07/1961 "On the possibility of creating a GR based on the R-9A and R-7A" addressed to: Smirnov L.V., Kalmykov V.D., Moskalenko K.S. Further - a report addressed to N.S. Khrushchev from 22.02.1961 "On the new scheme of intercontinental missiles GR" signed by S.P. Korolev, Mishin, Ryazansky, Pilyugin, Kuznetsov. Further - proposals for developments of OKB-1 including GR-1 from 05.03.1962 addressed to Ustinov, Malinovsky, Smirnov, Moskalenko, Semenov and Serbin. The design of the global missile was carried out with the expectation of using the R-9M

- 8K77 variant of the propulsion systems on the first and second stages , and the S1.5400 propulsion system on the third stage. As a result of the development of the missile, design and operational documentation was released. The operation of the missile was assumed with the same limitations and features as the operation of the R-9 missile . At the end of 1961, a proposal from OKB-1 was accepted to develop a rocket with NK-9 engines by Chief Designer N.D. Kuznetsov and an 11D726 engine from OKB-1 ( *source - Mishin* ). The preliminary design for the GR-1 with NK-9 engines on the 1st and 2nd cruise stages and an 8D726 liquid-propellant rocket engine on the 3rd stage was completed in April 1962 ( *source - Mishin* ). Officially, the development of the missile was started by Resolution of the Central Committee of the CPSU and the Council of Ministers of the USSR No. 1021-436 of May 12, 1962, Resolution No. 1021-438 of September 24, 1962 and Order of the State Committee for Defense Technology (GKOT) No. 640/06 of October 13, 1962. On December 18, 1962, the GKOT board for GR-1 adopted the following work plans: 1. 3rd quarter of 1963 - begin testing at site No. 51 of the Baikonur test site. In August 1963, the USSR Ministry of Defense must re-equip site 51 for the GR-1 ICBM. 2. 1st quarter. 1963 - submit proposals on landing routes and modes (MO with GKOT and GKRE) 3. 1st quarter of 1963 - comprehensive design assignment for the combat launch station] (BSS) of the GR-1 missile. Tactical and technical requirements for the GR-1 missile began to be developed on 02.01.1963 and agreed with the customer on 15.02.1963. On March 23, 1963, OKB-1 defended the preliminary design of the GR-1. In 1962, preparation of a series of missiles for flight tests began. According to various sources, a total of 3-4 missiles were produced. At least two missiles of this series later took part in parades in Moscow. The missiles were produced at the Experimental Machine-Building Plant OKB-1 in Kaliningrad, Moscow Region, and also at the Progress plant (Kuibyshev).

On December 6, 1963, by order of the commander of military unit 44275, an ad hoc technology group was created at the Baikonur Cosmodrome to test the

8K713 missile at site No. 51. In 1964, test group No. 3 of the same military unit, which had previously worked on testing the 8K75 / R-9 ICBMs, joined the work (numbering 169 people).

On February 6, 1964, at a meeting with S.P. Korolev, arguments were first voiced about the inexpediency of fine-tuning the GR-1, as well as the possibility of developing a light space launch vehicle based on it and a large anti-missile. On February 14, 1964, proposals were presented for a missile defense system based on the GR-1. On May 3, 1964, during bench tests of Block B of the GR-1 (2nd stage), an explosion and fire occurred (at the 23rd second of the block's operation). On May 14, 1964, a decision was made to terminate the development of the GR-1. Officially, the development of the GR-1 missile and its modifications was terminated in July 1964 "in connection with the fulfillment by the USSR of its obligations not to use outer space for military purposes." On August

17, 1965, a letter from S.P. Korolev was sent to the leadership of the USSR Ministry of Defense with a proposal to use the GR-1 to intercept satellites (possibly, the missile index is 8M111).

*Special thanks for preparing a selection of sources on the missile to the user "S-300" of our site and forum .*

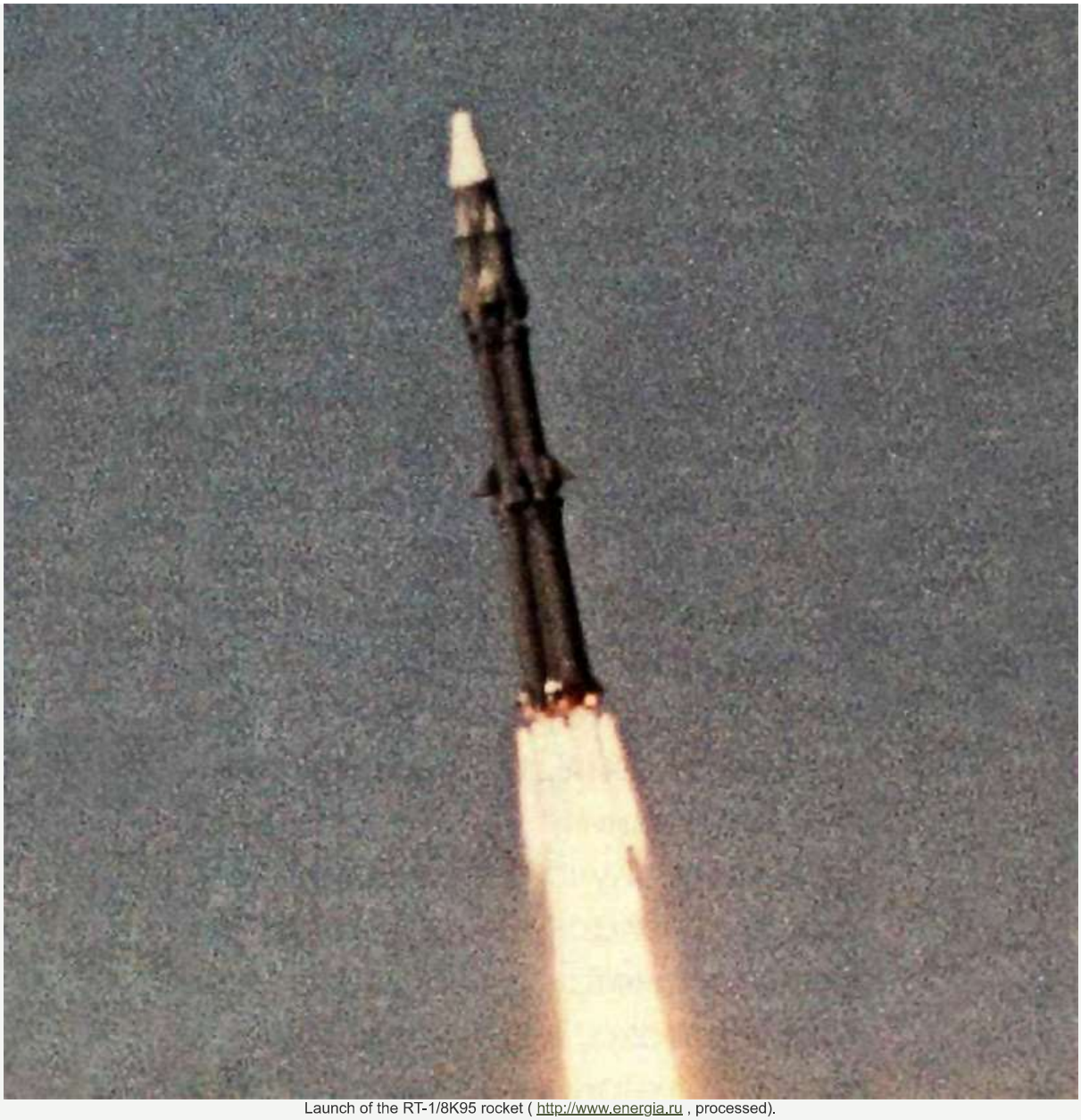
GR-1 missiles on Red Square, parade on November 7, 1965 (RGANTD, http://www.rusarchives.ru/).

Author: DIMMI Created: 29.03.2014 23:16:27 Comments: 10 READ THE FULL ARTICLE

## RT-1/8K95

**DATA FOR 2024 (standard update)**
**Missile RT-1 / 8K95**
**Missile RT-1-63 / 8K95-63**
★★★

An experimental solid-fuel medium-range ballistic missile. By the Resolution of the Council of Ministers of the USSR of June 27, 1958, a branch of OKB-1 was created on the basis of V.G.Grabin's TsNII-58, which was engaged in the development of solid-fuel missiles. The creation of the missile was started by the Resolution of the Council of Ministers of the USSR No. 1291-570 of November 20, 1959 "On the creation of the RT-1 product and the implementation of work on the RT-2 topic". The resolution determined the list of missile developers:
- OKB-1 GKOT (Chief Designer S.P.Korolev, Deputy Chief Designer for Solid-Fuel Missiles I.N.Sadovsky) - for the missile and the complex as a whole;
- KB-11 of the Ministry of Medium Machine Building (chief designers Negin, Kocharyants) - for a special charge with automation, initiation system, power supply, contact and non-contact sensors, control and measuring equipment and technological equipment for assembly and testing of a special charge at technical and launch positions;
- NII-125 of the State Committee on Defense Industry (chief designer - B. Zhukov, deputy chief designers - Smirnov and Pobedonostsev) - for the creation of solid fuel - the product "Nylon-B", industrial technology for its production, charges and engines. The development and testing of engines were to be carried out jointly with OKB-1;
- NII-885 of the State Committee on Defense Electronics (chief designers - Ryazansky, Pilyugin) - for the control system as a whole;
- NII-944 of the State Committee on Shipbuilding (chief designer - Kuznetsov) - for gyroscopic instruments;
- NII-627 and VNIT GK for automation and mechanical engineering (chief designers - Iosifyan and Lidorenko) - for on-board electrical equipment and current sources;
- GSKB Spetsmash GKOT (chief designer - Barmin) - for a complex of ground launch, docking, lifting and transport, compressor, auxiliary equipment and the development of combat launch stations;
- OKB-686 of the Moscow Economic Council (chief designer - Goltsman) - for a complex of ground electric power equipment. According to the Resolution, in May 1960 the developers had to present a preliminary design for the RT-1 rocket and variants of combat launch stations (a complex of ground equipment). The development of engines was carried out by NII-125 with the participation of the OKB-1 design team. The preliminary design of the 8K95 product was released in August 1960. Testing of the RT-1 missiles with a combined control system was planned to begin in the 4th quarter of 1960, and with an autonomous control system - in the 4th quarter of 1961. The testing location was the State Central Test Site Kapustin Yar.



Launch of the RT-1/8K95 rocket ( http://www.energia.ru , processed).

Author: DIMMI Created: 27.01.2013 00:35:58 Comments: 22 READ THE FULL ARTICLE

## Warheads and warheads of missile systems of the Strategic Missile Forces

**DATA AS OF 2024 (standard replenishment)**
**Warheads and warheads of the Strategic Missile Forces missile systems (ICBMs and MRBMs)**
★★★★

Single-block warheads:

| Name | Type | Launch vehicle | Complex | Chronology | Description |
|---|---|---|---|---|---|
| 46A / RDS-46A | GC | R-7/8K74 | | 1959 | Serial warhead with thermonuclear charge RDS-46A |
| 8F12 / 8F12N | GC | 8K63 | | | Warhead ( source ). Probably "product 49". Light warhead weighing 1364 kg. The missile was accepted into service with this warhead in 1959. |
| 8K15 | GC | 8K65 | | | Light thermonuclear warhead ( source ). Power - 2.3 Mt, weight - 1546 kg |
| 8F17 | GC | UR-500/8K82 "Proton" | K8K82 | project | Heavy thermonuclear warhead with a capacity of 150 Mt |
| 8F61 | GC | 8K64 | | | ( source ) |
| 8F112 | GC | 8K66 | | | ( source ) |
| 8F114 | GC | UR-200 / 8K81 | | | ( source ) |
| 8F115 | GC | 8K64, 8K65 | | | Lightweight warhead ( source ). Lightweight warhead with a parachute system (?). |
| 8F116 | GC | 8K64, 8K65 | | | Heavy warhead, weight - 2175 kg, power 5 Mt. |
| 8F117 | GC | 8K64, 8K65 , UR-500 / 8K82 | | | Heavy warhead ( source ). Weight - 2200 kg, power 6/10/15 Mt (according to different sources). According to other sources, weight is over 12 t. |
| 8F121 | GC | 8K84 | UR-100 / 8K84 | 19.04.1965 (first launch) | Single-block light warhead ( source ). Thermonuclear warhead RA50 with a capacity of 1 Mt developed by NII-1011 (Chelyabinsk-70, now VNIITF) |
| 8F125 | GC | 8K84 | | | ( source ) |

| | | | | | |
|---|---|---|---|---|---|
| 8F126 / AA48-2 | GC | 8K63 | | | Heavy thermonuclear BB, yield - 2.3 Mt, weight - 1680 kg. ( source ). Improved version of AA48-2 with improved safety of the warhead ( source ) |
| 8Ф128 | GC | 8K63U | | | Probably variant BB 8F126 ( source ) |
| 8Ф671 | GC | 8K67 (R-36) | | | Heavy GC ( source ) |
| 8Ф672 | GC | 8K67 (R-36) | | | Lightweight GC ( source ) |
| 8Ф74 / 8Ф674 | GC | 8K67 (R-36) | | | Light warhead ( source ). The warhead was tested starting from the first launch of the carrier on September 28, 1963. The charge is R-354-G ( source ) |
| 8F675 / 8F675-6000 / 8F675-7000 / 8F675U | GC | 8K67 (R-36) | | | Heavy warhead ( source ). Charge A-604-G ( source ) |
| | GC | "Dwarf" | | | Single-block nuclear warhead with a complex of means to overcome missile defense (KSP PRO, developed by NII-108) |
| 15F842 GC, 15F842P1 "Lead" / 15F842P3, 15F843 BB | GC | 8K84 , 8K84M | UR-100 / 8K84 UR-100UTTH / 8K84M | 0.09.1967 (first launch) | Light warhead ( source ). Length - 1.45 m, Diameter - 1.25 m, Weight - 760/800 kg. Charge with a capacity of 500 kt developed by KB-11 |
| 15F992U | GC | 8K84U | | | ( source ) |
| 15F1 | GC | 8K98 | | | GC case ( source ) |
| 15F981 | GC | 8K98 | | | GC case |
| 15F982 | GC | 8K98P | | | GC case |
| 15F993 | GC | 8K99 | | | Light warhead body ( source ) |
| 15F141 / 15F141-500 | GC | 8K67MA (R-36) / 15A14 (R-36M) | | | Single-block heavy warhead with a charge capacity of 20 Mt, 15B85 case ( source ) |
| 15F142 / 15F142-500 | GC | 15A14 (R-36M) | | | Single-block light warhead with a charge capacity of 8 Mt, 15B86 case ( source ) |
| 15F156 | GC | 15A15 | | | Lightweight monoblock warhead. Not mass produced ( source ) |
| 15F171 / 15F172 | GC | 15A18M (R-36M2) | | | Heavy monoblock warhead, platform 15F171 ( source ), VNIIEF charge |
| 15F175 / 15F175-2 / 15F176 | GC | 15A18M (R-36M2) | | | Light single-block warhead. 15F175 - platform, 15F176 - warhead ( source ), VNIIEF charge |
| 15F202 | GC | UR-100K / 15A20 | | | The case of a monoblock warhead ( source ). Charge RA64 (VNIITF) |
| 15F421 | GC | RS-14/15Zh42 "Temp-2S" | 15P642 | | Thermonuclear warhead with a set of decoys, yield 650-1450 kt, warhead weight - not less than 650 kg |
| 15F483 | GC | 15Ж48 | | | ( source ) |
| 15F581 / AA88 | GC | 15Ж58 "Topol" | | | Single-block warhead of the Topol ICBM, AA88 charge ( source ) |

Author: DIMMI Created: 09/14/2016 23:58:17 Comments: 37 READ THE FULL ARTICLE

## Iskander-1000 - SS-X-33

**DATA FOR 2024 (standard update)**
**"Iskander-1000" (conditionally) - SS-X-33**

Medium-range ballistic missile of the universal modular missile system based on the technical solutions of the 9K720 Iskander-M OTRK is being developed as of 2024 at the Machine-Building Design Bureau (Kolomna). On

June 28, 2024, V.V. Putin announced the possibility of starting the production and deployment of medium- and shorter-range missiles in response to similar actions by the United States outside their national territory. Earlier, on December 17, 2023, the Commander-in-Chief of the Strategic Missile Forces of Russia noted that the Russian military-industrial complex can begin production of serial models of missile systems with medium- and shorter-range missiles in the shortest possible time. On May 6, 2024, the Russian Ministry of Foreign Affairs announced the start of production of medium- and shorter-range missile systems.

One of the variants of such a complex with a range of up to 1000 km could be the upgraded 9K720 Iskander-M ballistic missile with an updated engine, control system and improved warhead.

The new missile for the Iskander-M was first demonstrated in a video for the 78th anniversary of the Kapustin Yar test site on May 15, 2024.

The name "Iskander-1000" is conditional and unofficial.

A launch pad with a new type of missile at the Kapustin Yar test site (first published on 15.05.2024, source )

Author: DIMMI Created: 24.07.2024 07:59:44 Comments: 4 READ THE FULL ARTICLE

## 406mm gun 2A3 / SM-54 Condenser

**DATA FOR 2024 (in progress)**
**2A3 / SM-54 "Condenser" / "Condenser-2P"**
★★★

406.4 mm self-propelled gun. The study of the topic of creating an artillery atomic munition began in 1952. On April 15, 1952, a report from the General Staff of the USSR Armed Forces "On the development of atomic weapons in the USA for solving operational-tactical tasks" was received in the name of I. V. Stalin. The report indicated that, according to our source, the USA had developed samples of "tactical" atomic bombs and shells. Including for the 280 mm M-65 gun. The T-124 nuclear munition with a W-9 nuclear charge with a capacity of 15 kt was created in 1952. The firing range was 24 km.

Special decisions of the USSR Government in 1953 regulated the procedure and terms for development of artillery nuclear systems in the USSR, and also determined the heads of these developments:
1) 406.4-mm self-propelled artillery gun SM-54 "object 271" with the "Kondensator" special round. Developer: SKB of the Barrikady plant. Testing of the gun is to be carried out in 1957;
2) 420-mm mortar 2B2 "Oka" - "object 272". With the "Transformer" special round. SKB MOP, city of Kolomna, designer B. I. Shavyrin. Testing of the mortar mount is to be carried out in 1957;
3) 406-mm (the caliber was increased to 420-mm during development) dynamo-jet gun S-103. With the "Transformer" special round. Developer: NII-88 V. G. Grabin. Firing tests to be conducted in 1957;
4) To develop a nuclear munition equipped with an RDS-41 atomic charge for special artillery rounds. Development of the nuclear munition to be assigned to NII-24, Chief Designer. Self-propelled 406-mm gun SM-54, developer: SKB of the Barrikady plant I. P. Dzyuba.

Development of the atomic charge was to be assigned to KB-11 (VNIIEF), Chief Designer Yu. B. Khariton. The technical design for the atomic charge for a nuclear weapon was presented by KB-11 to the industry leadership in 1955. Field tests of the RDS-41 atomic charge were successfully completed on March 16, 1956.

Development of the SM-54 "Kondensator" installation was started by the Special Design Bureau of the Barrikady Plant (Volgograd) in 1954. Development of the artillery part and sighting devices for the SM-54 gun was carried out by TsKB-34 under the supervision of I.I. Ivanov in accordance with Resolution of the Council of Ministers No. 764-457 of April 18, 1955.

The main purpose of the gun is to destroy enemy military and industrial facilities at a distance of more than 25 km with conventional and nuclear charges. For secrecy purposes, the project was named "Kondensator-2P". Later it received the GRAU index 2A3. A prototype of the installation on the "Object 271" chassis was created by the Kirov Plant on the basis of the T-10M tank.

In 1955, Plant No. 221 ("Barrikady") manufactured a 406-mm experimental ballistic barrel SM-E124, which was used to test shots for the SM-54 cannon. The installation of the experimental SM-54 cannon on the chassis of "object 271" was completed at the Kirov Plant on December 26, 1956. Tests of the cannon of the experimental SM-54 cannon were conducted in 1957-1959 at the Central Artillery Proving Ground near Leningrad ("Rzhevsky Proving Ground") together with the 420-mm self-propelled mortar 2B1. The tests revealed many design flaws in the artillery system: strong recoil of the mount (several meters), damage to the idler supports when firing nuclear shell simulators, destruction of equipment and tearing off the gearbox mounts. After each shot, the weapon's material part was inspected in order to identify design flaws and eliminate them.

By 1957, 4 more serial 2A3 installations were built for testing, which were shown on November 7, 1957, at the Parade on Red Square in Moscow.

In 1958, the results of the work on the creation of nuclear artillery systems were considered at the Scientific and Technical Council of the MSM, where it was recognized that the said work was untimely against the background of the successful development of missile systems of the Ground Forces for various purposes. Subsequently, work on the development of nuclear ammunition for large-caliber artillery was carried out by NII-1011 (VNIITF).

One of the surviving examples of the self-propelled gun is on display at the Museum of the Russian Armed Forces in Moscow.

Self-propelled guns 2A3 "Kondensator" on the day of the Parade on Red Square on November 7, 1957 in Moscow (photo from the archive of Mikhail Mikhin, http://onepamop.livejournal.com).

Author: DIMMI Created: 29.12.2011 15:46:51 Comments: 3 READ THE FULL ARTICLE

## RT-2PM2, RS-12M1 / RS-12M2 Topol-M - SS-27 SICKLE-B

**DATA FOR 2024 (standard update, v.2)**
**R&D "Universal" / R&D "Topol-M", missile 15Zh55 / 15Zh65 - SS-X-27 SICKLE-B**
**Complex RS-12M1 "Topol-M" / 15P155 (PGRK), missile RT-2PM1 / 15Zh55 - SS-27 SICKLE-B**
**Complex RS-12M2 "Topol-M" / 15P165 (ShPU), missile RT-2PM2 / 15Zh65 - SS-27 SICKLE-B**

★★ Intercontinental ballistic missile (ICBM) / road-mobile missile system (PGRK). The complex and missile were developed by the Moscow Institute of Thermal Engineering (MIT), chief designers are Boris Nikolaevich Lagutin and Yuri Semenovich Solomonov (in different years, source ). By Resolution of the Council of Ministers of the USSR No. 173-45 of February 9, 1987, it was prescribed to begin simultaneously at NPO Mashinostroyeniya (Reutov, the Albatross project ), at KB Yuzhnoye (Dnepropetrovsk) and at the Moscow Institute of Thermal Engineering work on the development of promising ICBMs with the ability to overcome the multi-echelon missile defense system of a potential enemy with universal basing - with launch options from silo launchers and in the form of a PGRK ( *source - Strategic missiles, source* ). Work at KB Yuzhnoye was carried out on the Universal R&D - a solid-fuel ICBM was being developed in PGRK and silo launcher variants. At MIT, work was carried out on the Topol-M R&D - the development of an ICBM to replace the Topol ICBM with two types of basing - PGRK and silo launchers. In August 1988, Yu.S.Solomonov (MIT) held talks with the Yuzhnoye Design Bureau, as a result of which by the end of 1988 the two design bureaus had jointly developed a technical proposal for a single missile within the framework of the Universal research project ( *historical - Strategic missiles* ). Full-scale development of the RT-2PM2/15Zh65 missile was started jointly by MIT and the Yuzhnoye Design Bureau by decision of the USSR Military-Industrial Complex No.323 of 09.02.1989 on the subject of the Universal research project. The design was planned to be completed by the end of 1991 in two versions - a missile with a platform for distributing unguided warheads with solid-propellant rocket motors and without a missile defense overcoming means complex (MRC) - developer MIT (mobile missile complex, PGRK), a similar missile with a platform for distributing warheads with a monopropellant liquid engine and with a MRC MRC - developer - Yuzhnoye Design Bureau (Dnepropetrovsk, silo missile complex 15P065). Due to a number of production reasons, the missiles differed in the design of the TPK and therefore had some differences and received different indexes - 15Zh55 for PGRK and 15Zh65 for PU ( *historical - Strategic missile* ). The development of the 1st stage, the version of the warhead dispensing platform and the missile's nose cone was carried out by the Yuzhnoye Design Bureau, the development of the 2nd and 3rd stages, the instrument compartment, its own version of the warhead dispensing platform and the unguided warhead was carried out by MIT. The 1st stage engine,The head fairing and the second version of the platform for breeding with a monopropellant engine were developed by the Yuzhnoye Design Bureau ( *source - Rockets and spacecraft* , ★★

*Strategic missiles* ). At the end of 1989, a joint preliminary design of the missile and silo version of the missile system was released. In the first half of 1990, a preliminary design of the PGRK was released ( *historical - Strategic missiles* ).

The first flight model of the 1L version of the missile by the Yuzhnoye Design Bureau was assembled and prepared for testing at the Plesetsk test site in December 1991. The missile's shipment from the plant to the test site was cancelled by the decision of the Commander-in-Chief of the USSR Strategic Missile Forces. In 1991, MIT began forming an adjusted cooperation of developers with an emphasis on Russian enterprises ( *historical - Strategic missiles* ). In 1992, after the appeal of the General Designer of the Yuzhnoye Design Bureau S.N. Konyukhov to the President of Russia B.N. Yeltsin, a meeting was convened to discuss the continuation of the joint development of ICBMs. The decision was not made and in April 1992 the participation of the Yuzhnoye Design Bureau in the development of the missile was terminated ( *source - Missiles and spacecraft...* ). In 1992, an addendum to the preliminary design of the Topol-M ICBM was issued, taking into account changes in the cooperation of developers - the engine of the 1st stage of the missile was now being developed by NPO Iskra (Perm). The main basing option for the silo version was the option using the launch site and silos of the UR-100NUTHH systems with 15A35 missiles after modernization of the launch equipment (developed by the Vympel Design Bureau, Moscow). The addendum to the preliminary design also provided for the use of silos of the R-36MUTTH and R-36M2 missiles in the event of a complete reduction of these missiles under the START-2 treaty, which could happen ( *source - Strategic missiles* ).

By the Decree of the Government of the Russian Federation No. 7-2 of 06.01.1993 and the Decree of the President of the Russian Federation Boris Yeltsin No. 275 of 22 February 1993 "On the creation of the Topol-M missile system and the serial production of the Topol-M missile system", MIT became the lead enterprise for the development of the Topol-M. A decision was made to develop a unified missile with only one version of combat equipment - with a solid-fuel propulsion system of the combat stage. After which the developments on the RT-2PM2 version with a KSP PRO and a monopropellant engine of the dispersal platform were transferred from the Yuzhnoye Design Bureau to the Moscow Institute of Thermal Engineering. A sample of the 1L missile was transferred to Russia on 15 January 1995 ( *source - Rockets and spacecraft...* ).

Launch of the 15Zh55 rocket of the Topol-M complex (2008 or earlier)

Author: DIMMI Created: 07.01.2018 19:05:17 Comments: 45 READ THE FULL ARTICLE

## Complex 9K76 Temp-S, missile 9M76 - SS-12 / SS-22 SCALEBOARD

**DATA FOR 2024 (standard update)**
**9K76 "Temp-S" complex, 9M76 / "TR-1" missile - SS-12A SCALEBOARD-A / KY-11**
**Complex 9K76 "Temp-S", missile 9M76B / "TR-1" - SS-12A SCALEBOARD-A**
**9K76 "Temp-S" complex, 9M76B1 / "TR-1M" / "mod.9M76B" / 9M76M (?) missile - SS-12B / SS-12M / SS-22 SCALEBOARD-B**
★★★★★

Front-level missile system / operational-tactical extended-range missile system. The system was developed at NII-1 (since 1967 - Moscow Institute of Thermal Engineering) under the supervision of A.D. Nadiradze.

After the formulation of mixed solid fuel was developed at NII-125 (later renamed NIKHTI, and later - NPO "Soyuz", Lyubertsy) under the supervision of future academician B.P. Zhukov, in 1961 at NII-1 under the supervision of A.D. Nadiradze, design assessments were conducted for the creation of a new

ballistic missile with a solid-propellant rocket motor on this new type of fuel.

Full-scale development of the Temp-S complex was started by Resolution of the USSR Council of Ministers No. 934-405 dated September 5, 1962 by the following cooperation of enterprises:
- NII-1 (MIT since 1967) - prime contractor for the complex and missile
- NII-592 (N.A. Semikhatov) together with the Miass Mechanical Plant (chief designer - Yu.A. Buynov) - missile control system
- NII-125 (NPO Soyuz, M.I. Rusin) - solid propellant charge of the engine
- Design Bureau of the Barrikady plant (Volgograd) - self-propelled launcher and other ground equipment)
- KB-11 (VNIIEF, E.N. Negin, S.G. Kocharyants) - thermonuclear warhead

The missile and complex were created using the developments on the Temp theme . The preliminary design of the complex was approved on December 13, 1962. According to the preliminary design, the missile was to use a variable-yield thermonuclear charge "906V" with a warhead with a "skirt". The missile's performance characteristics were set with a range of 300-900 km. Additional studies were conducted to expand the temperature range of the missile's combat use in the range from –10 °C to +40 °C, instead of the 25±10 °C adopted at the beginning of development. In addition, the developer committed to conducting studies to increase this range to –30 °C.

In 1962, by Resolution of the USSR Council of Ministers, preparations for the production of 9M76 missiles began at the Votkinsk Machine-Building Plant No. 235 (Votkinsk).

In May 1963, the project of the missile and the complex was presented to the GRAU. However, even at the development stage, the council of chief designers, on its own initiative, approached the supervising profile committees and ministries with a proposal to use a special charge "910" in the creation of the missile. After adjusting the draft design in accordance with the Resolution of the Council of Ministers No. 517-180 of May 8, 1963, the special charge "910" (both developed by KB-11 / VNIIEF), which was 105 kg lighter, was introduced into the project. This made it possible to abandon a number of devices that helped stabilize the missile in flight. Thus, abandoning the stabilizing skirt made it possible to reduce the length of the missile from 13.5 to 12.5 meters, which improved the placement of the missile on the launcher and made the missile transportable using the available means. Changes in the design required the development of additions to the draft design of the missile and the complex. The updated draft design was reviewed in December 1963.

By mid-1963, the experimental design work on the Temp-S project was significantly behind schedule, threatening the submission of the complex for joint flight tests (JFT). At a meeting of the USSR Supreme Council of National Economy Commission on Military-Industrial Issues on July 24, 1963, the activities of research and development, research and production enterprises and relevant ministries tasked with developing the 9K76 complex were criticized. In accordance with the Commission's decision, the enterprises developing the missile and complex components were required to eliminate the identified deficiencies, fulfill delivery plans, and ensure the fulfillment of the established JFT deadlines (fourth quarter of 1963), as set by the Resolution of the CPSU Central Committee and the USSR Council of Ministers of May 8, 1963.

*Special thanks to "Pensioner" ( http://russianarms.ru ) for assistance in preparing the materials.*

The 9K76 "Temp-S" complex - the 9P120 SPU and the MIP test and launch vehicle
("60 years in service at the Kapustin Yar test site. 1946-2006, GTsMP "Kapustin Yar", 2006).

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## 77Я6 Voronezh-M / DM / VP

**DATA AS OF 2024 (standard replenishment)**
**77Ya6 "Voronezh-M"**
**77Ya6-DM "Voronezh-DM"**

**77Ya6-VP "Voronezh-VP"**

★★★★

Early warning radar of the missile attack warning system (EWS) and space control of high factory readiness (VZG). Research into the possibility of constructing an EWS radar of high factory readiness was started by NIIDAR in the late 1970s. In the course of these works, NIIDAR, based on the developments of the USSR Ministry of Oil and Gas, developed, tested and transferred to serial production a unified container-equipment box that met customer requirements and had a number of modifications. The creation of a radar using high factory readiness technology was first proposed by NIIDAR during the development of the Selenga long-range detection radar in 1986.

The first model, the 77Ya6 Voronezh-M meter-range radar, was developed and is being manufactured by the A.L. Mintz RTI JSC (Moscow), the chief designer was V.I. Karasev, and as of 2010, the chief designer of the VZG-M radar was V.I. Shustov, and the deputy chief designer was V.P. Savchenko. The first Voronezh-M station in the village of Lekhtusi (Leningrad Region) was started to be built by NPP Piramida (St. Petersburg) in May 2005 and entered into experimental combat duty in December 2006. The early warning radar was fully accepted into service and entered into regular combat duty in 2009.

The second model - the 77Ya6-DM Voronezh-DM station was developed by JSC NPK NIIDAR (former Research Institute of Long-Distance Radio Communications, Moscow) with the participation of JSC RTI named after Academician A.L. Mintz, chief designer - S.D. Saprykin. The head station of the decimeter range 77Ya6-DM "Voronezh-DM" in Armavir was put into operation in 2008 and put on regular combat duty on 26.02.2009. Successful testing by JSC "NPK NIIDAR" within the framework of the R&D topic "Respublika-P" of the head article 77Ya6-DM in Armavir allowed to switch to serial production of the radar 77Ya6-DM. The operator is the Space Forces of the Armed Forces of Russia, since December 1, 2011 the Aerospace Defense Forces. As of 2011-2012, serial production of the radar is carried out by the Saransk Television Plant ( *http://www.mil.ru* ).

The third model - 77Ya6-VP "Voronezh-VP" - was also developed by RTI named after academician A.L. Mintz and is a development of the 77Ya6 "Voronezh-M" radar.

Early warning radar 77Ya6 "Voronezh-M", object 4524, Lekhtusi settlement, Leningrad region, 08.08.2009 (photo from the archive of RussianArms.Ru, http://fotki.yandex.ru ).

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## Complex 9K720 Iskander - SS-26 STONE - Complex structure and chronology

**DATA FOR 2024 (standard update, v.2)**
**Complex 9K720 "Iskander-M" - SS-26 STONE-A**

★★★★★

**Complex structure, deployment and chronology.**


SPU 9P78-1 with cruise missiles R-500 of the missile system 9K720 "Iskander-M" of the first serial brigade set on the day of transfer of equipment to the 107th RBR. Kapustin Yar, 28.06.2013 ( http://i-korotchenko.livejournal.com ).

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